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Reg.No. : .....

Name: .....

Seventh Semester B.Tech Degree Examination, November 2016

(2013 Scheme)

13.705.8 ADVANCED COMPUTATIONAL METHODS (C) (Elective II)

Time : 3 Hours **Max Marks :100**

Instructions: Answer all questions in Part A and any one question from each module in Part B

PART-A

1. Discuss different types of errors associated with numerical methods
2. What do you mean by multiple regression analysis?
3. Explain Hermite's interpolation
4. Write short note on Milne's predictor-corrector method.
5. What are partial differential equations? How are they classified? 5x4 = 20 Marks

PART-B

Module I

6. Solve by Gauss Elimination method:

$$x_1+2x_2+5x_3+x_4 = -8$$
$$-x_1+7x_2+2x_3+4x_4 = 15$$
$$x_1+x_4 = 3$$
$$4x_1+x_2-x_3+x_4 = 11$$

20 Marks

OR

7. Find the largest eigen value and eigen vector for the given matrix. Adopt 'Power Method'

$$\begin{pmatrix} 2 & 1 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 2 \end{pmatrix}$$

20 Marks

Module II

8. A simply supported beam carries concentrated load P at its midpoint. Corresponding to various values of P the maximum deflection Y is measured and the data are given below:

P : 100 120 140 160 180 200

Y:0.45 0.55 0.60 0.70 0.80 0.85

Find the equation of the form Y= a + bP 20 Marks

OR

9. Obtain the cubic spline approximation of the given data, hence determine y(0.5) and y'(2)

X:	0	1	2	3
Y:	-5	-4	3	6

20 Marks

Module III

10. Find y(0.1), y(0.2) given dy/dx = x - 2y, y(0)=1 taking h=0.1 using 4^{th} order Runge-Kutta method.

20 Marks

OR

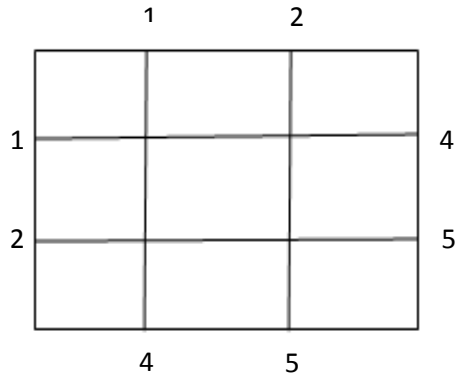
11. Solve the boundary value problem:

$$x\frac{d^2y}{dx^2} + y = 0\,, y(1) = 1, y(2) = 2, \qquad Take\ h = 1/4.$$

20 Marks

Module IV

12. Solve the equation $u_{xx} + u_{yy} = 0$ for the square mesh with boundary value as shown in figure.



20 Marks

OR

13. Find the values of u(x,t) satisfying the parabolic equation $u_t = 4u_{xx}$ under the conditions u(0,t) = u(8,t)=0 and u(x,0) = 4x - $x^2/2$ at the points x=i: i = 0,1,2,....7 and t= j/8: j= 0, 1, 2,....5.

20 Marks